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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/671,423

09/24/2003

George Connors

1870-332

5807

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EXAMINER

KERNS, KEVIN P

ART UNIT

PAPER NUMBER

1793

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/671,423	<b>Applicant(s)</b> CONNORS ET AL.	
	<b>Examiner</b> Kevin P. Kerns	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 43-60,62,64,66,68-76 and 79-86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 43-49,51-60,62,64,66,68-76 and 79-86 is/are rejected.
- 7) ☒ Claim(s) 50 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 43-47, 49, and 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Connors, Jr. (US 5,482,248) in view of Mitkova et al. (US 2004/0083926).

Connors, Jr. (col. 2, lines 52+) teaches a slurry composition (casting composition) for a mold, comprising alumina particles with amount of 65-90 wt% and diameter size of 30 micron to 7 mm, silicon carbide with amount of 1-35 wt% and particle size between 30 micrometer and 1.5. millimeters, colloidal silica binder of 8-14

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wt%, setting agent such as 0.2 wt% magnesia and free carbon in the form of graphite of 5 wt%.

Connors, Jr. fails to teach the use of welan gum in the slurry composition. However, Mitkova et al. (paragraphs 8+) teach the use of welan gum in a molding material for the purpose of improving instability of the slurry composition (molding material). It would have been obvious to one having ordinary skill in the art to provide Connors, Jr. the use of welan gum as taught by Mitkova et al., in order to improve the slurry composition (molding material) instability (Mitkova et al.; paragraphs 27+).

4. Claims 48 and 79-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Connors, Jr. (US 5,482,248) in view of Mitkova et al. (US 2004/0083926), as applied to claims 43-47, 49, and 51-54 above, and further in view of Svec (US 4,131,475).

Connors, Jr. in view of Mitkova et al. fail to teach the use of three different sizes of alumina. However, Svec (col. 2, lines 18+) teaches the use of three different sizes of alumina in forming a slurry composition for the purpose of making molds having an effective balance of casting surface quality and mold permeability. It would have been obvious to one having ordinary skill in the art to provide Connors, Jr. in view of Mitkova et al. the use of three different sizes of alumina as taught by Svec, in order to make molds having an effective balance of casting surface quality and mold permeability (Svec; col. 2, lines 40+).

5. Claims 55-60, 62, 64, 66, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitkova et al. (US 2004/0083926) in view of Banerjee et al. (US 5,147,830).

Mitkova et al. (paragraphs 8+) substantially teach the claimed lost wax casting method, comprising coating a wax pattern with a dry mix composition including binder, aggregates, carbon, setting agent, stabilizers, and polypropylene fibers, wherein the aggregates including alumina and silicon carbide and the stabilizers including polysaccharide gum such as welan gum.

Mitkova et al. fail to teach the use of slurry composition including colloidal silica binder. However, Banerjee et al. (col. 2, lines 39+) teach the use of colloidal silica binder of 8-14 wt% in a slurry composition (casting composition) including silicon carbide of the claimed particle size between 30 micrometer and 1.5. millimeters and weight percent of between 5-25 wt%, larger particle size of alumina of brown fused component between 100 micron and 3 millimeter, free carbon in the form of graphite of 5 wt%, and setting agent such as 0.2 wt% magnesia for the slurry composition for the purpose of effectively reducing drying time of 15 minutes to 5 hours at room temperature and reducing cracking in making steel-containment equipment including a casting mold. It would have been obvious to one having ordinary skill in the art to provide Mitkova et al. the use of slurry composition including colloidal silica binder as taught by Banerjee et al., in order to reduce drying time and reduce cracking in making a mold or steel-containment equipment (Banerjee et al.; col. 4, lines 18+).

6. Claims 69-76 and 83-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitkova et al. (US 2004/0083926) in view of Banerjee et al. (US 5,147,830), as applied to claims 55-60, 62, 64, 66, and 58 above, and further in view of Svec (US 4,131,475).

Mitkova et al. in view of Banerjee et al. fail to teach the use of three different sizes of alumina. However, Svec (col. 2, lines 18+) teaches the use of three different sizes of alumina in forming a slurry composition for the purpose of making molds having an effective balance of casting surface quality and mold permeability. It would have been obvious to one having ordinary skill in the art to provide Mitkova et al. in view of Banerjee et al. the use of three different sizes of alumina as taught by Svec, in order to make molds having an effective balance of casting surface quality and mold permeability (Svec; col. 2, lines 40+).

#### ***Allowable Subject Matter***

7. Claim 50 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

8. The examiner acknowledges the applicants' amendment received by the USPTO on January 25, 2008. The applicants' remarks/arguments overcome the 35 USC 103(a) rejection of claim 50 based on the Schramm reference, such that claim 50 is now

indicated as allowable subject matter in above section 7. Claims 43-60, 62, 64, 66, 68-76, and 79-86 remain under consideration in the application.

9. Applicants' arguments filed January 25, 2008 have been fully considered but they are not persuasive.

With regard to the applicants' remarks/arguments on pages 11-18 of the amendment, it is noted that the argument in section B (on pages 14-15 of the remarks section) is rendered moot since Schramm is no longer applied in the 35 USC 103(a) rejections. Responses to the applicants' arguments in sections A, C, D, and E follow:

Regarding the arguments in section A (pages 11-14 of the remarks section), the applicants state that there is no teaching, suggestion, or motivation to combine the references (Connors, Jr. and Mitkova et al.), as well as that common sense would not lead one of ordinary skill in the art to combine the references, for which the applicants allege are "non-analogous" art. The examiner respectfully disagrees, as it is noted that all of the claims rejected by this combination are "composition" claims (with the "intended use" of the composition being for an investment casting mold). In this instance, Connors, Jr. and Mitkova et al. are used in different types of molds, but Connors, Jr. only lacks the welan gum component. In response to applicants' argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge

generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the advantageous component (welan gum) of Mitkova et al. would improve the slurry composition (as provided as motivation by Mitkova et al.). Absent a showing of unexpected results (in the form of evidence via an affidavit or declaration), one of ordinary skill in the art would have recognized that welan gum would improve the properties of the composition of molds. In response to applicants' argument that Connors, Jr. and Mitkova et al. are nonanalogous art (as the applicants argue on pages 13 and 14), it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both references disclose compositions for use in molding materials, for which only a single component (welan gum) is absent from Connors, Jr., such that Mitkova et al. disclose welan gum as an advantageous additive.

Regarding the arguments in section C (pages 15 and 16), the applicants state that Svec does not teach or suggest the features of "Claims 40 and 79-82" (which should instead be "Claims 48 and 79-82") and further present a table (bridging pages 15 and 16) that shows higher particle sizes than what is disclosed by Svec. Svec discloses/suggests that casting surface quality and mold permeability would be improved by providing alumina to the composition of the investment casting mold (similar to what the applicants disclose). Importantly, the applicants are referred to the



claim language of claims 48 and 79, which disclose the specific alumina compositions that include ranges of particle diameters at given weight percentages of the composition, such that optimization of these ranges would be subject to routine experimentation by one of ordinary skill in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). Again, the applicants have not provided any evidence (affidavit/declaration) to show the advantageous properties of the ranges of components set forth in the claims.

Regarding the arguments in section D (pages 16 and 17), the applicants state that Banerjee et al. is “non-analogous” art (for essentially the same reasons as the applicants set forth for Connors, Jr. and Mitkova et al. in the above section A arguments). The examiner respectfully disagrees, as Banerjee et al. disclose mold compositions, albeit for a different type of mold. In this instance, Mitkova et al. only lack a colloidal silica binder, and Banerjee et al. disclose that the colloidal silica binder is advantageous for reducing drying time and reducing cracking in making a mold or steel-containment equipment. In response to applicants' argument that Mitkova et al. and Banerjee et al. are nonanalogous art (as applicants argue on page 17), it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention.

See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both references disclose compositions for use in molding materials, for which only a single component (colloidal silica binder) is absent from Mitkova et al., such that Banerjee et al. disclose the colloidal silica binder as an advantageous additive.

Regarding the arguments in section E (pages 17 and 18), the applicants' arguments addressing Svec are discussed in the response to section C above, as Svec discloses that casting surface quality and mold permeability would be improved by providing alumina to the composition of the investment casting mold, and the optimum or workable ranges of compositions would be determined by routine experimentation.

As a result, claims 43-49, 51-60, 62, 64, 66, 68-76, and 79-86 remain rejected.

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571)272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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May 4, 2008